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Systematic Arrangement of the Mollusks of the Family VIVIPARIDÆ, and others, inhabiting the United States.

BY THEODORE GILL.

My attention having been recently again attracted to the classification of the family of Viviparidæ by the printing of the "Descriptive Catalogue" of my friend, Mr. Binney, I propose to offer the following revision of the arrangement of the species of North America. There are four distinct groups of species on the continent which some will call genera, and others subgenera. These have been formerly comprehended under the generic name of *Paludina*, or *Viviparus*; the four were first recognized as distinct by Mr. G. W. Tryon, Jr., in "Notes on American Fresh-Water Shells."* The characters which appear to be the principal distinctive ones have, however, remained unnoticed by Mr. Tryon and all his predecessors, while those assigned to the respective groups have been rather vague and uncertain. A species closely related to, if not identical with, the type of *Viviparus*—*V. georgianus* ex Lea—has been referred by the Adams and Cueni to the subgenus *Melantho*, while, on the other hand, a true *Melantho*—*M. cyclostomatiformis*—is placed in *Viviparus*; the distinctive characters of the two groups, as given by those gentlemen, are by no means obvious.

It has recently been customary to consider the structure of the operculum as having a paramount value and indicating family distinction. On such grounds, the genus *Amnicola* has been separated from the family to which *Bythinia* was referred, and has by some been considered as the type of an independent one;† while others have referred it to the Melaniidæ,‡ Rissoidæ,§ or Littorinidæ,|| Moquin-Tandon, to whom we are indebted for the most perfect account extant of the extra-marine mollusks of any country, has considered those differences to which others have assigned a family value as only subgeneric. That learned malacologist, in his precious work on the land and fresh-water mollusks of France, has combined in the genus *Bythinia*, the *Amnicolæ* and *Bythinix* of American and most other naturalists, giving to the former the sectional name of *Bythinella*, and to the latter, that of *Elona*. There can be little or no doubt that those groups differ generically, but they should apparently be approximated to form a family distinct from the true *Viviparidæ*.

I would then distinguish the two families as follows, my knowledge of the anatomical characters being chiefly due to M. Moquin-Tandon. But, in the first place, the following analytical synopsis of the families of Pectinibranchiates, represented in the fresh-water streams of North America, is offered. In this table, only the most striking and not always the most important characters are given.

- | | |
|--|--------------|
| I. Teeth of lingual membrane 3 1 3..... | TÆNIOGLOSSA. |
| A. Gills concealed. | |
| 1. Rostrum moderately produced and entire or simply notched. | |
| a. Foot not produced beyond head: branchiæ uniserial. | |
| *Lateral jaws present. (Aperture of shell acuminate behind; generally channelled at front; size moderate)..... | MELANIIDÆ. |
| **Lateral jaws obsolete. (Aperture of shell sub-circular, broadly rounded at front; size very small)..... | AMNICOLIDÆ. |
| β. Foot produced considerably beyond the head; branchiæ triserial..... | VIVIPARIDÆ. |

* Proc. Acad. Nat. Sciences, Philadelphia, 1862, p. 451.

† Lea, Proc. Acad. Nat. Sciences, of Philadelphia, 1862.

‡ H. & A. Adams, Chenu, Binney.

† Tryon, op. cit., supra, 1862, p. 451

‡ Gray.

- II. Rostrum produced, extending into two much elongated, subulate lobes..... AMPULLARIIDÆ.
 AA. Gills pinnate, plumose and exsertile forwards..... VALVATIDÆ.
 ii. Teeth of lingual membrane $x \mid 4.1.4 \mid x$; central very unequal; lateral slender, hooked and very numerous... RHIPIDOGLOSSA.
 Shell with a straight, flattened columella..... NERITIDÆ.

Size, in the several families above enumerated, is, as a rule, correlative with structure. The *Ampullariidæ* are comparatively large; the *Viviparidæ* moderate; the *Melanidæ* smaller, and the *Valvatidæ* and *Amnicolidæ* generally may be almost said to be minute.

The family of MELANIDÆ is here restricted to exclude *Faunus* Montfort, (= *Pirena* Lam.), *Melanatria* Bowdich, *Melasma* Sw., (= *Clionella* Gray,) *Melanopsis* Lam., *Vibex* Oken and *Hemisinus* Sw. These appear to belong to a distinct family equally distinguished by the projecting foot of the animal and the notch of the aperture of its shell. The family may be named MELANOPIIDÆ. The other genera or subgenera that have been proposed scarcely appear to exist in nature. There is, however, one form which has received no name; it embraces the species figured by Chenu, under the names of *Melanopsis princeps* (Lea) and *M. acicularis* Ferussac. This genus is most nearly allied to *Faunus*, with which it agrees in physiognomy, but is distinguished by the absence of a posterior sinus of the outer lip; it may be named FAUNOPSIS.* The American Melanidæ form a peculiar subfamily, — *Ceraphasiinæ*.

The AMNICOLIDÆ of North America may be distributed among two subfamilies, — AMNICOLINÆ and BYTHININÆ. The Amnicolinæ represent, apparently, three genera, — *Amnicola*; *Chilocyclus*† (Gill), with the circular lip reflected, and with a shell like *Amnicola*, and *Somatogyrus*; (n. g.)‡ with the body whorl globose, and the aperture obliquely semicircular. The validity of *Pomatopsis*, as defined by Tryon, is for me very doubtful.

The Ampullariidæ are represented by the genus *Ampullaria* Lam.

The Valvatidæ are divisible among two genera — *Valvata*, from which Tropicidina is apparently not separable, and *Lyogyrus*, (n. g.)§ in which the last whorl is separated from the preceding and revolves within the normal spiral of increase.

The families of Viviparidæ and Amnicolidæ may be further distinguished by the following characters, which are essentially the same as those used by M. Moquin-Tandon to distinguish the so-called "genera" *Paludina* and *Bythinia*. The contrast is made simply because the genera have been confounded under one family, for they are really less related to each other than *Bythinia* is to the Melanians, or some other families.

Family VIVIPARIDÆ (Gray,) Gill.

Animal oval, entirely retractile within the shell. Foot oval, much dilated, passing beyond the muzzle, and provided with an anterior groove. Jaws two,

* FAUNOPSIS (*Faunus*, mythological name and $\text{O-}\mu\varsigma$), *Melanopina*. — Testâ elongatâ, subulatâ, aperturâ parvâ rhombo-ovata, postice acutâ, antice bene sinuata, labro externo acuto, nec sinuatâ.

Type. *Melanopsis princeps* Lea.

† CHILOCYCLUS ($\chi\iota\lambda\omicron\varsigma$, lip, and $\kappa\upsilon\kappa\lambda\omicron\varsigma$, circle.) — Testâ conicâ, anfractibus convexis, aperturâ modicâ, circulari, labro reflexo.

Type. *Cyclostoma cincinnatensis* Lea.

‡ SOMATOGYRUS ($\sigma\omicron\mu\alpha\text{-}\tau\omicron\varsigma$, body and $\gamma\upsilon\rho\omicron\varsigma$, whorl.) — Testâ anfr. primo globoso, spirâ parvâ, aperturâ obliquiter semi-circulari, labro externo acuto.

Type. *Amnicola depressa* Tryon.

§ LYOGYRUS ($\lambda\upsilon\omicron$, to loose and $\gamma\upsilon\rho\omicron\varsigma$, whorl.) — Testâ oblongâ, anfr. convexus, anfr. ultimo disjuncto, aperturâ circulari.

Type. *Valvata pupoidea* Gould.

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lateral, narrow and convex. Tentacles cylindrical, subulate, obtuse, with the eyes on very short peduncles towards their external inferior third. Branchiæ in three rows, in the form of flattened filaments, slightly subulate, and scarcely dilated towards the inferior third.

Generative organs on the right side; verge internal, simple and contained in the tentacle; female orifice under the border of the mantle on the same side.

The genus *Viviparus*, or the Viviparidæ of this synopsis, are the only mollusks which appear to undoubtedly belong together; of the other genera that have been referred by the Adams, Gray and Chenu to the family, *Tanalia* and *Paludomus* are apparently rather related to the Melaniidæ, and nearly agree in form of the shell, with *Leptoxis* of Raf. or *Ancylotus* of Say, while the structure of the animal, as far as described, is essentially similar to that of the true Melanians* and they agree with *Viviparus* only in possessing an operculum whose elements are concentric, but which is in other respects quite different. The genera *Laguncula* of Benson, and *Rivulina* of Lea, are unknown to me.

All the known types of Vivipari are represented in the United States.

Tulotoma Hald.

Viviparus Lam.

Melantho Bowd.

Lioplax Trosch. = *Haldemania* Tryon.

Family AMNICOLIDÆ (Tryon.) Gill.

Animal oval or elongated, completely retractile within its shell. Foot oval or rounded, generally narrow, and not continued in front of the rostrum. Jaws obsolete. Tentacles cylindrical setaceous, pointed, with the eyes sessile at their postero-external bases. Branchiæ in a single row, in the form of transverse folds, somewhat dilated at the middle. Generative organs on the right side; verge external, behind the tentacle, bifid and with unequal branches; female orifice under the margin of the mantle, on the same side.

The following types belong to this family:

Amnicola Gld. and Hald.; *Chilocyclus* Gill; *Somatogyrus* Gill.

Bythinia Leach.

The subgenus *Bythinella* of Moquin-Tandon corresponds to the genus *Amnicola* of Gould and Haldeman, and consequently should be so treated, although its first species apparently belong to the subgenus *Pomatiopsis* of Tryon;† the materials now in my possession, or in the Smithsonian Collection, do not enable me to form a satisfactory opinion concerning that group: at present, I am disposed to doubt its distinction from *Amnicola*.

In the present paper it is proposed to classify only the Viviparidæ.

The family of Amnicolidæ has been recently proposed by Mr. Tryon for the genus *Amnicola*, but that gentleman has given no diagnosis. It is more nearly allied to the Melaniidæ than to the Viviparidæ, and the genus *Amnicola* has been referred to that family by Mr. Lea.

The material of the Smithsonian Institution, &c., being now in the hands of Mr. Binney, I am unable to arrive at a satisfactory conclusion regarding the limits of our species, and, while expressing my opinions on the classification of our species by reference to those admitted by Binney, except in a single case, I feel somewhat disposed to dissent from him in several instances. As such a difference of opinion would not necessitate any modification of the distribution among groups here proposed, I do not feel at liberty to dissent from him at the present time.‡ I have seen specimens of almost all the species enumerated.

* The American Melaniidæ, so far as I know, have not a fringed mantle and consequently belong to a different group.

† The subgenus, as defined by Tryon, is alluded to; the type of that group (*A. lapidaria*) may, however, be quite different, and a representative of the family Aciculidæ.

‡ The identification of *Paludina Elliotti* Lea, with *P. cyclostomatiformis*, is most doubtful. I am disposed to believe that, while the latter is a true *Melantho*, the former is a 1863.]

The forthcoming work of Mr. Binney, some time since issued as "proof," however naturalists may be disposed to differ from him, will be of considerable value, as the full descriptions and figures of all real, as well as nominal species, are copied, and the labor and time of referring to many separate volumes, some of great rarity, will be thus saved.

Family *VIVIPARIDÆ* (Gray,) Gill.

Animal elongated, semicylindrical, with the spiral visceral sack contained in a turbinate shell, into which the rest of the body is also perfectly contractile. Mantle encircling the neck with a very thin fold, simple in front. Foot, distinct from the neck, moderate, extending beyond the head, arched in front, and obtusely extended towards its angles, rounded behind; adapted only for crawling. Head moderate, with the rostrum produced, entire or nearly so in front above. Jaws two, lateral. Tentacles two, contractile, with the eyes on short tubercles on the outer sides of their bases. Lingual ribbon strong, slender and elongate. Teeth in seven longitudinal rows, (3 | 1 | 3) laminar, with recurved apices; lateral convergent.

Branchiæ internal, and along an oblique line down the left side of the branchial cavity, in three regular rows, composed of flattened, slightly subulate filaments, scarcely dilated towards the posterior third (in types). Respiratory orifice under the collar, at the upper and hinder part of the neck. Generative organs, unisexual, on the right side; verge at the end of the tentacle, in which the deferent canal is contained. Female orifice on the same side, under the margin of the mantle.

Shell turbinate, conoid, covered with a thin, transparent, or rather thick, greenish, or olive periostraca; with the septa persistent; the aperture subovate, and with a continuous peritreme.

Operculum annular.

The shells of the groups and genera of the family represented by American species are distinguished as follows:

- α. Shell subconic; lips continuous on a uniform plane..... VIVIPARI.
 - 1. Shell with revolving nodulous carinæ. Aperture slightly effuse at base..... *Tulotoma*.
 - 2. Shell with the whorls smooth. Aperture broadly rounded at base..... *Viviparus*.
- β. Shell turreted. Outer lip subangulated, sinuous or incurved at base..... LIOPLACES.
 - 1. Operculum with concentric elements..... *Melantho*.
 - 2. Operculum with a spiral nucleus *Lioplax*.

The groups of Vivipari and Lioplaces, among which the American Viviparidæ may be thus distributed, are decidedly distinguished by differences of dentition, which are coincident with the well marked conchological characters. The dentition of *Viviparus*, *Melantho* and *Lioplax* has been examined; although that of *Tulotoma* is still unknown, it is not probable that it will be found to exhibit any important difference when compared with the dentition of *Viviparus*.

Group VIVIPARI.

The rachidian teeth are broad, rather wider and more or less angulated towards the base; recurved at their superior margins, which are also denticulated

Lioplax; and in this opinion I am supported by Mr. Tryon. Although autoptically unacquainted with *P. Elliotti*, I judge from the figure that the form of the aperture and the carination of the whorls are alike in both; the operculum of *P. Elliotti* is unknown; a knowledge of its structure will decide the doubts concerning the affinity of the species. I am not acquainted with the reasons influencing Mr. Binney in his union of the two species. The arguments in favor of a union of so dissimilar species might not be undesirable, for an examination of the figures alone would scarcely "convince one of the identity" of the two, but rather produce a contrary belief.

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on each side of a central lobe or tooth. The inner teeth of the pleura are also broad, oblong, often narrowed near the base, and with the upper margins denticulated; the median and outer rachidian teeth are narrow, with the upper margins subtruncated and denticulated.

TULOTOMA Haldeman.

Tulotoma Haldeman, Supplement to No. 1, of a "Monograph of the Limniades," &c., of N. A., p. 2. "Oct., 1840."

Shell imperforate, conic, rather thin, becoming more elongated and conic in its progress to maturity, with the whorls little convex; whorls in adult with two nodulous revolving carinæ, the lower of which is covered by, but produces a ridge beneath the suture of the succeeding whorl. Aperture obliquely semi-cordate, slightly effuse at base; lips continuous in a uniform plane; outer lip thin; columellar lip straight or little concave and obtusely connected behind with the outer.

Operculum corneous, with its elements entirely concentric.

Tulotoma is represented by only one species inhabiting the streams of Georgia and Alabama. It is readily distinguished from the typical *Vivipari*, to which it appears to be most nearly allied, by the form of the aperture, the nodulous carinæ of the adult shell, and also by the form of the adult shell itself. The adult has been described as "heavy," but it does not appear to be really much more so than that of *Viviparus*.

Tulotoma magnificum Tryon ex Conrad. = *Vivipara magnifica* B. ex Conrad.

VIVIPARUS Montfort ex Cuv.

Vivipare Cuv., 1808, Lam., 1809.

Viviparus, Montfort.

Shell imperforate or rimate, conic or subconic, thin, with the whorls convex or rather flattened, smooth or carinated. Aperture obliquely oval and rather wide, broadly rounded at base. Lips continuous on a uniform plane; outer lip thin, columellar lip concave, closely appressed behind to the body whorl and forming nearly a right angle with the outer.

Operculum corneous, with its elements wholly concentric.

Viviparus, as here restricted, is a very natural and widely-distributed group. Its chief distinctive character is the form of the aperture and outer lip. The American species of the genus or subgenus are divisible among three sections, distinguished by a difference of form.

§ I.

Shell ventricose, with very convex, smooth whorls.

Viviparus lineatus ex Val. = *V. vivipara* Binney, pp.

Viviparus Wareanus ex Shutt., Binney.

Viviparus Troostianus ex Lea, B.

Viviparus intertextus ex Say, B.

Viviparus coosaensis ex Lea, B.

The *V. subglobosa* (Binney ex Say) is known to me only through descriptions. Mr. Binney is inclined to doubt its pertinence to this genus, but would rather refer it to the same group as *Leptoxis isogona*, *L. pallida*, and *L. altilis*.

§ II.

Shell with the whorls more or less flattened obliquely, or in the direction of the spire, smooth or carinated.

Viviparus subpurpureus (Ad.) ex Say.

§ III.

Shell with the whorls ornamented by revolving carinæ, two of which are visible on each covered whorl.

1863.]

Viviparus multicarinatus (B.) ex Hald.

The third section of *Viviparus*, or another closely related to it, perhaps includes *V. bengalensis* (Ad.) ex Lam., *V. borroughianus* Gill ex Lea, *V. bilineatus* Gill, and other Indian species; the suspicions that might be entertained as to the strict affinity of species so widely separated geographically, can only be relieved by an examination of the mollusks themselves; the shells are very similar.

The genus *Viviparus* is represented by a number of species in the lignite beds of Fort Union which have been referred by Messrs. Meek and Hayden to the Eocene epoch. My friends, Messrs. Meek and Hayden, have adopted the same conclusions as myself regarding the distinction of *Viviparus* and *Melantho*, and have now referred, with myself, six of the species formerly described by them, to *Viviparus*, accepting that name, and two others to *Melantho*. Five of those species are distributable among the three groups above indicated, while the sixth is the representative of a distinct one. The following list shows their affinities:

- | | |
|----------------------------------|--------|
| | § I. |
| <i>Viviparus Leaii</i> M. and H. | |
| | § II. |
| “ <i>retusus</i> M. and H. | |
| “ <i>Conradi</i> M. and H. | |
| | § III. |
| “ <i>trochiformis</i> M. and H. | |
| “ <i>Leidyi</i> M. and H. | |
| | § IV. |

Shell rather thick, with numerous revolving lines, sometimes obsolescent.

Viviparus Reynoldsianus M. and H.

These species will be illustrated and fully described in the forthcoming work of Meek and Hayden on the Fossils of the Upper Missouri country.

In the beds at Fort Washington on the banks of the Potomac River, which probably belong to the Post Pliocene epoch, a species of *Viviparus* is found in great numbers, which appears to be referrible to the *V. subpurpureus*; the latter is now only known to exist in Florida and the Western States. Mr. L. E. Chittenden first obtained specimens from Fort Washington; Mr. Binney also considers the specimens to be referrible to the *V. subpurpureus*.

Group LIOPLACES.

The rachidian teeth are broadest and angulated at the base; narrowed above, and recurved, with the margins entire. The inner teeth of the pleura are oblique, oblong, recurved and entire; the median and outer pleural teeth are also entire, obliquely recurved, narrowed and terminating each in a point, or claw-shaped.

MELANTHO Bowdich.

Shell imperforate or rimate, turreted, thick and of very compact structure, never provided with colored bands, with the whorls more or less compressed longitudinally, smooth or rarely carinated. Aperture obliquely semi-cordiform, rather narrow, broadly rounded and sinuous or retreating backwards at the base, the outer lip trenchant, and produced near the base; columellar lip nearly straight, closely appressed to the body whorl and forming nearly a right angle with the outer.

Operculum corneous, with its elements wholly concentric.

Melantho is a type peculiar to America, I believe. It is readily recognizable by the peculiar physiognomy of the shell, produced by the compression of the whorls in a longitudinal direction, so that the sides of each are nearly parallel, and a turreted form is thus obtained. It may be therefore likened, as to form,

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to the genus *Latrunculus* of Gray, or *Eburna* of others.* The shell structure appears to be more compact than in the typical *Vivipari*, and the species generally are more ponderous. The angulation of the outer lip and the sinus at the base are characteristic, and contrast strongly with the uniform plane of the aperture of *Viviparus*.

The figure of a "deformed" *V. decisa* (36) published by Binney, gives an exaggerated idea of this peculiarity of form.

The soft parts of *Melantho* appear to also differ from those of *Viviparus*, the rostrum being smaller and less protractile, and the auricles behind the tentacles are likewise much smaller.

The earliest known American species of *Melantho* were contemporaneous with the *Vivipari*, three species having been discovered by Dr. Hayden in the lignite beds of Fort Union and described by Meek and Hayden as *Vivipara multilineata* (= *V. nebrascensis* M. and H.), *V. vetusta* and *Melania* or *Lymnæa multistriata*. These have now been referred to the genus *Melantho* in the manuscript work of Meek and Hayden.

Melantho multilineatus.

" *vetustus*.

" *multistriatus*.

The following are referrible to the same genus,—*Melantho*:

Melantho ponderosa Ad. ex Say = *V. ponderosa* B.

" *decisa* Ad. ex Say = *V. decisa* B.

" *coarctata* Gill ex Lea = *V. coarctata* B.

" *cyclostomatiformis* Gill ex Lea = *V. cyclostomatiformis* B.

" *incrassata* Ad. ex Lea = *V. incrassata* B.

" *decapitata* Gill ex Anth. = *V. decapitata* B.

" *regularis* Gill ex Lea = *V. regularis* B.

LIOPLAX Troschel.

Lioplax Troschel, Gebiss der Schnecken, p. 100, 1857.

Haldemania Tryon, Proc. Acad. of Nat. Sciences, 1862, p. 451.

Paludina sp. auct.

Vivipara sp. auct.

Shell imperforate or rimate, turreted, rather thick; of very compact structure; unprovided with colored bands; whorls carinated and longitudinally flattened, with the sides nearly parallel. Aperture little oblique, oblong-oval, broadly rounded at the base, and sinuous or retreating backwards, the sharp outer lip being subangulated near the front; columellar lip concave appressed to the body whorl, forming an obtuse angle with the outer.

Operculum corneous, with a large spiral nucleus, but with the subsequent accretions concentric.

This type is evidently most nearly related to *Melantho*, but differs especially in the spiral nucleus of the operculum, as well as in the form of the aperture. A single species is found, which has been ascertained to inhabit some of the streams of Ohio, Indiana, Kentucky, Pennsylvania and New Jersey. We are indebted for its subgeneric distinction to Prof. Troschel and Mr. Tryon.

Lioplax subcarinata = *Haldemania subcarinata* = *Vivipara subcarinata* B. ex Say.

NOTE.—I regret that I have not been able to avail myself more fully of the invaluable "Gebiss der Schnecken" of Dr. Troschel. The four parts were only received at the Smithsonian Institution, through the kindness of Prof. Agassiz,

* The name of *Latrunculus* has been recently applied by Dr. Günther to a genus of Gobioid fishes, but, if no other reasons, cannot be retained on account of preoccupation of the name. The genus had, however, previously received the name of *Aphyia* from Risso.

the day before the reception of the proof of the foregoing paper, and consequently too late to compare my views with those of the distinguished author. I am happy to find that the validity of the groups of Viviparidæ, which have been above defined, is confirmed by the researches of Dr. Troschel, who has examined the dentition of several species of true *Viviparus*, besides that of the *Paludina subcarinata* of Say, for which he has proposed the name *Lioplax*. The latter name is now substituted for *Haldemania* of Tryon, and is modified to form the name of a group containing that genus and *Melantho*.

Additional Remarks on the North America *ÆGIOTHI*.

BY ELLIOTT COUES, A. M., M. D.

Since the publication in the Proceedings of the Academy for November, 1861, of my Monograph of the genus, the Smithsonian has been constantly in the receipt of additional specimens from all parts of North America. These were mostly the *A. linarius*; but collections from the North have usually contained a number of well characterized examples of *A. exilipes*. Nothing, however, of special importance has been elucidated, until the reception of a series collected in winter in the vicinity of Quebec. These specimens, as they throw much light on the variations of the typical species of the genus, *A. linarius*, will merit a brief notice. If the deductions I have drawn from these specimens are warrantable, we have in North America the forms long recognized in Europe as *A. Holbölli* and *A. rufescens*; and these are both rather races than distinct species.

Selecting from the series two or three skins which differ most markedly from the usual style of *linarius*, and comparing them with a typical specimen of the latter from Philadelphia, I find the following differences:

The bird is very decidedly larger. The difference in total length is nearly one inch, as near as I can judge from the dried skins. The wings and tail are each about a fourth of an inch longer. The tarsus and middle toe with its claw are together about two-tenths of an inch longer.* The bill and feet are decidedly larger and stouter, though perhaps not disproportionately so. The former is somewhat elongated; its lateral outlines straight instead of a little concave; its culmen slightly curved. The bill is of a bright chrome-yellow, except just along the culmen and at the extreme tip. The gular spot seems rather large. In other respects, the two birds are quite identical, for, with these differences in size, there is an exactly proportionate increase in the bill, feet, wings and tail; and the colors of the two do not differ appreciably, except in the bill, and perhaps the larger gular spot. The specimens give the idea, in fact, of overgrown individuals of the common *linarius*.

But now, on examining in detail the rest of the series, I find that, from the one extreme, the characters of which have just been given, there is a complete and gradual transition,—a diminution in size, down to specimens which cannot possibly be distinguished from typical *linarius*. There is no break in the series; no dividing point where we can stop calling the specimens "*linarius*" to give them another name; in spite of the discrepancy which is so evident between the two extremes.

The point of interest which attaches to these specimens, is the bearing they may have on the mooted question of the claims of *Ægiotus Holbölli* to full specific rank. As was the case at the time of the preparation of my Monograph, I have never examined a specimen which professed, upon good European authority, to be that species. Careful examination, however, of the

*The tarsus, middle toe and claw together, of the specimens under consideration, measure absolutely 1.20 inches; the same parts in *linarius* are about one inch: in *exilipes* .80 of an inch.